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(19) (CA) **APPLICATION FOR CANADIAN PATENT** (12)

(54) Dual Wing Agricultural Implement

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(73) Same as inventor

(57) 3 Claims

The present invention relates to a dual wing agricultural implement.

BACKGROUND OF THE INVENTION

There are numerous dual wing agricultural implements which have provision in their design for width adjustment. The purpose of this adjustment in width is to provide two modes; an operative mode and a relatively narrower transport mode. However, there would be numerous advantages provided if the dual wing agricultural implement was also width adjustable in the operative mode. One advantage is that the agricultural implement could be used with row crops and spaced according to the requirements of the crop in question. Another advantage is that the agricultural implement could be used in the operative mode in a variety of confined spaces, such as between hedge rows. A further advantage is that when the agricultural implement was being used in working the ground the spacing of the ground working tools could be adjusted where required, for example, where the tractor was having trouble getting traction in hard ground.

SUMMARY OF THE INVENTION

What is required is a dual wing agricultural implement which is width adjustable in the operative mode.

According to the present invention there is provided an improvement in a dual wing agricultural implement. Dual wing agricultural implements have a central frame with a first side, a second side, a first end and a second end. A first wing extends beyond the first side. A second wing extends beyond the second side. A hitch is secured to the first end, whereby the central frame is secured to a tow vehicle. The improvement lies in a unique and unobvious wing design. Each wing is comprised of a plurality of parallel members having a first end and a second end. The members are pivotally secured in spaced relation to the central frame such that the members pivot laterally in relation to the central frame. A plurality of transverse cross-members are pivotally mounted to and extend between the members thereby

maintaining the parallel spacing of the members. A geometric figure of a parallelogram is formed by a transverse plane which extends through the mounting positions of the cross-members and the parallel members. The parallelogram is oriented such that the transverse plane remains constant in relation to the direction of travel regardless of the pivotal positioning of the wings. Means is provided for pivotally moving the wings laterally in relation to the central frame. Tool mounting means are secured to the cross-members.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other features of the invention will become more apparent from the following description in which reference is made to the appended drawings, wherein:

FIGURE 1 is a top plan view of a first embodiment of the invention in a first position.

FIGURE 2 is a top plan view of a first embodiment of the invention in a second position.

FIGURE 3 is a top plan view of a second embodiment of the invention in a first position.

FIGURE 4 is a top plan view of a second embodiment of the invention in a second position.

FIGURE 5 is a perspective view of a portion of the second embodiment illustrated in **FIGURES 3** and **4**.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The present invention relates to an improvement in a dual wing agricultural implement. A first embodiment, generally identified by reference numeral 10, is illustrated in **FIGURES 1** and **2**. A second embodiment, generally identified by reference numeral 12, is illustrated in **FIGURES 3, 4** and **5**. Two embodiments are illustrated to assist in explaining those aspects of the invention which are essential and those aspects which are merely a matter of design choice and as such subject to change.

Dual wing agricultural implements 10 and 12 both have a central frame 14. For the purpose of this description each central frame 14 will be considered to have a first side 16, a second side 18, a first end 20 and a second end 22. A first wing 24 extends beyond first side 16. A second wing 26 extends beyond second side 18. A three point hitch 28 is secured to first end 20. To this point the description is not dissimilar to dual wing agricultural instruments known in the art. There will now be described a unique and unobvious wing design. The features common to both embodiments will first be described and then the differences between the embodiments will be noted.

Each of wings 24 and 26 are comprised of a pair of parallel members 29 and 30 having a first end 32 and a second end 34. First end 32 of member 29 is pivotally secured to central frame 14 in spaced relation first end 32 of member 30. Members 29 and 30 pivot laterally in relation to central frame 14. A plurality of transverse cross-members 36 are pivotally mounted to and extend between members 29 and 30 thereby maintaining the parallel spacing of members 29 and 30. A geometric figure of a parallelogram is formed by a transverse plane 38 and parallel members 29 and 30. Transverse plane 38 extends through mounting positions 40 of cross-members 36. The parallelogram is oriented such that transverse plane 38 maintains a constant angular position in relation to the direction of travel, denoted by arrow 42, regardless of the pivotal positioning of wings 24 and 26. This constant angular position is critical as will be apparent from the description of operation. Tool mounting means in the form of brackets 44 are secured to cross-members 36. In **FIGURES** 1 through 4, tool mounting brackets 44 are illustrated with tools 45 inserted.

Both embodiments of the invention, dual wing agricultural implements 10 and 12 use similar "means" to pivotally move wings 24 and 26 laterally in relation to central frame 14. In each case a travel block 46 is secured to central frame 14. Travel block 46 is axially movable parallel to the direction of travel, as denoted by arrow 42. Linkage arms 48 extend between travel block 46 and wings 24 and 26. With the linkage of travel block 46 and wings 24 and 26 through linkage arms 48, movement of travel block 46 results

in movement of wings 24 and 26. Some form of drive means must be secured to central frame 14 and communicate with travel block 46 to apply a force to move travel block 46. In dual wing agricultural implement 12 the drive means consists of a screw 50 which is manually operated by means of a handle 52.

Both dual wing agricultural implements 10 and 12 have gauge wheels 54 secured to one of cross-members 36 of wings 24 and 26 adjacent second end 34 of members 29 and 30. Gauge wheels 54 facilitate the transport of dual wing agricultural implements 10 and 12 when in the transport mode, and serve a dual function of limiting the depth of penetration into a groundsurface (not shown) of tools 45 mounted in tool mounting brackets 44 when in the operative mode. Referring to **FIGURE 5**, gauge wheels 54 are secured to cross-members 36 so that their angular relationship to the direction of travel as represented by arrow 42 will not be altered with the pivoting of wings 24 and 26. Each of gauge wheels 54 is mounted to a bar 56 having a plurality of holes 57 along its length. Bar 56 extends through a bracket 58 secured to one of cross-members 36. Bracket 58 also has a plurality of holes 59. The height of gauge wheels 54 in relation to wings 24 and 26 is adjustable by extending a pin 60 through one of holes 59 in bracket 58 and a selected one of holes 57 in bar 56.

Some design variations and the differences between dual wing agricultural implements 10 and 12 will now be described. With both embodiments central frame 14 is generally "T" shaped. With dual wing agricultural implement 12, as illustrated in **FIGURES 3** and **4**, the "T" shape of central frame is not essential. The purpose of the "T" shape in this embodiment is merely to accommodate three point hitch 28. First end 32 of each of members 29 and 30 is secured to one of sides 16 or 18 of central frame 14. With first wing 24 first end 32 of each of members 29 and 30 is secured to first side 16. With second wing 26 first end 32 of each of members 29 and 30 is secured to second side 18. In contrast, dual wing agricultural implement 10, as illustrated in **FIGURES 1** and **2**, shows a different manner of securing wings 24 and 26 to central frame 14. First end 32 of members 29 and 30 are secured to the "T" formed at first end 20 of central frame 14.

Another difference between dual wing agricultural implements 10 and 12 is in transverse cross-members 36. Referring to **FIGURES** 1 and 2, in dual wing agricultural implement 10 transverse cross-members 36 are coplanar with transverse plane 38. Dual wing agricultural implement 12, as illustrated in **FIGURES** 3 and 4, demonstrates that transverse cross-members 36 need not be straight or parallel in order for the invention to be operable. The geometric relationship forming a parallelogram relates to the mounting positions of transverse cross-members 36 and not to the structure represented by transverse cross-members 36.

Another difference between dual wing agricultural implements 10 and 12 is the angular relationship between transverse plane 38 and the direction of travel as represented by arrow 42. Referring to **FIGURES** 1 and 2, with dual wing agricultural implement 10 transverse plane 38 is substantially perpendicular to the direction of travel as represented by arrow 42. This relationship is maintained regardless of the pivotal position that wings 24 and 26 assume. Referring to **FIGURES** 3 and 4, with dual wing agricultural implement 12 transverse plane 38 is substantially parallel to the direction of travel as represented by arrow 42. This relationship is maintained regardless of the pivotal position of wings 24 and 26. It can be seen from this that maintaining the angular relationship constant is the key and not any one particular relationship. As long as the positioning in relation to the direction of travel as represented by arrow 42 is constant, tool mounting brackets 44 can be installed so that tools 45 always are in the desired position, which is most cases would be facing the direction of travel as represented by arrow 42.

Another difference between dual wing agricultural implements 10 and 12 is the positioning of gauge wheels 54. It is preferable that gauge wheels 54 be positioned to provide support to wings 24 and 26. This can best be done by positioning gauge wheels 54 toward second end 34 of parallel members 29 and 30. **FIGURES** 1 and 2 illustrate one manner of positioning gauge wheels 54, which is to be contrasted with the alternate positioning illustrated in **FIGURES** 3 and 4.

Another difference between dual wing agricultural implements 10 and 12 is the range of movement of wings 24 and 26, and the positioning of wings 24 and 26 when in a "fully opened" or "fully closed" position. **FIGURE 1** illustrates a fully opened position for dual wing agricultural implement 10. **FIGURE 2** illustrates a fully closed position for dual wing agricultural implement 10. **FIGURE 3** illustrates a fully opened position for dual wing agricultural implement 12. **FIGURE 4** illustrates a fully closed position for dual wing agricultural implement 12. It is apparent that the range of movement and positioning within the range is not critical to the invention. It should be noted that all the **FIGURES** represent an operative position, and that there are a range of possible positions between the fully opened and fully closed positions.

The use and operation of the dual wing agricultural implement 12 will now be described with reference to **FIGURES 3** and **4**. The operation of dual wing agricultural implement 10 is analogous and as such will not be further described. To prepare dual wing agricultural implement 12 for operation three point hitch 28 is connected to a tow vehicle, which would usually be a tractor. Gauge wheels 54 would normally be in a transport mode, namely, with pin 60 positioned through selected holes in bracket 58 and bar 56 such that tools 45 are suspended above the groundsurface. Wings 24 and 26 are usually in a fully closed position, as illustrated in **FIGURE 4**. In this transport mode, dual wing agricultural implement 12 can be manoeuvred by hand like a wheel barrow. In this same transport mode dual wing agricultural implement 12 can be towed behind a truck. Once dual wing agricultural implement 12 is connected to a three point hitch of a tractor, however, the tractor typically will lift dual wing agricultural implement 12 off the ground when transporting it to a field. Once in the field where it is to be used, the height of gauge wheels 54 are adjusted by a removal and reinsertion of pin 60, so that tools 45 penetrate into the groundsurface to a desired depth. The overall width of dual wing agricultural implement 12 and consequently the spacing of tools 45 is manually adjusted with handle 54 which turns screw 50 to move travel block 46. Movement of travel block 46 results

in a movement of wings 24 and 26 due to the linkage through linkage arms 48. It should be noted that tools 45 maintain equidistant spacing through the entire range of adjustments; the adjustment may move tools 45 closer together, but this distance is always an equal distance.

It will be apparent to one skilled in the art that the embodiments as described achieve the stated object of the invention of providing a dual wing agricultural implement which is width adjustable in an operative position. It will also be apparent to one skilled in the art that there are modifications which may be made to the embodiments illustrated without departing from the spirit and scope of the invention. In particular, travel block 46 can be moved through the use of the wide variety of drive means. Instead of handle 52 screw 50 can be turned by a motor. Instead of using screw 50, hydraulic or pneumatic cylinders may be used. When used with hydraulic activators adjustments may be made to the spacing of tools 45 while the dual wing agricultural implement is in motion. There are alternate configurations to dual wing agricultural implements 10 and 12; these configurations are too numerous to illustrate them all. For example, in addition to parallel members 29 and 30, a third, a fourth member, etc. can be added. Another alternate configuration can be obtained by lengthening and mounting additional tool mounting brackets 44 on linkage arms 48. It is even possible to configure dual wing agricultural instrument with pairs of members pivotally mounted at their centre point and crossing to form an "X".

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. An improvement in a dual wing agricultural implement, having a central frame with a first side, a second side, a first end and a second end, a first wing extending beyond the first side, and a second wing extending beyond the second side, and a hitch secured to the first end, whereby the central frame is secured to a tow vehicle, the improvement comprising:

a. each wing, comprising:

i. a plurality of parallel members having a first end and a second end, the members being pivotally secured in spaced relation to the central frame such that the members pivot laterally in relation to the central frame, a plurality of transverse cross-members pivotally mounted to and extending between the members thereby maintaining the parallel spacing of the members, a transverse plane extending through the mounting positions of the cross-members, the transverse plane and the parallel members forming a geometric figure of a parallelogram with the transverse plane remaining constant in relation to the direction of travel regardless of the pivotal positioning of the wings;

b. means for pivotally moving the wings laterally in relation to the central frame; and

c. tool mounting means secured to the cross-members.

2. The improvement as defined in Claim 1, the means for pivotally moving the wings laterally in relation to the central frame, comprising:

a. a travel block secured to the central frame, the travel block being axially movable parallel to the direction of travel;

b. linkage arms extending between the travel block and the wings, such that movement of the travel block results in a movement of the wings; and

c. drive means secured to the central frame and communicating with the travel block whereby a force is applied to move the travel block.

3. The improvement as defined in Claim 1, having gauge wheels secured to one of the cross-members of the wings adjacent the second end of the members, thereby limiting the depth of penetration into a groundsurface of tools mounted in the tool mounted means.

ABSTRACT OF THE DISCLOSURE

An improvement in a dual wing agricultural implement. Each wing consists of a plurality of parallel members having a first end and a second end. The members are pivotally secured in spaced relation to a central frame such that the members pivot laterally in relation to the central frame. A plurality of transverse cross-members are pivotally mounted to and extend between the members thereby maintaining the parallel spacing of the members. A geometric figure of a parallelogram is formed by a transverse plane which extends through the mounting positions of the cross-members and the parallel members. The parallelogram is oriented such that the transverse plane remains constant in relation to the direction of travel regardless of the pivotal positioning of the wings. Tool mounting brackets are secured to the cross-members.

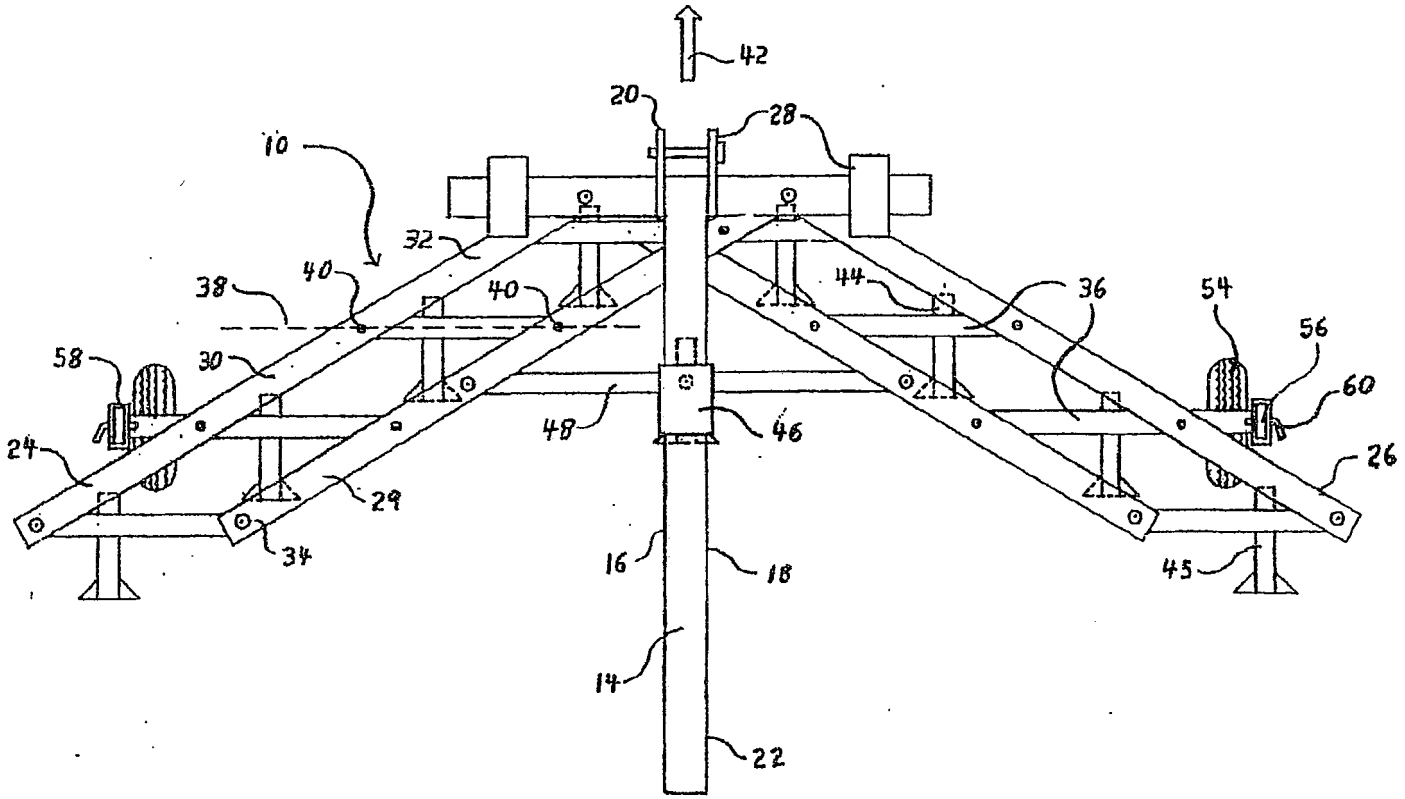

FIG.1

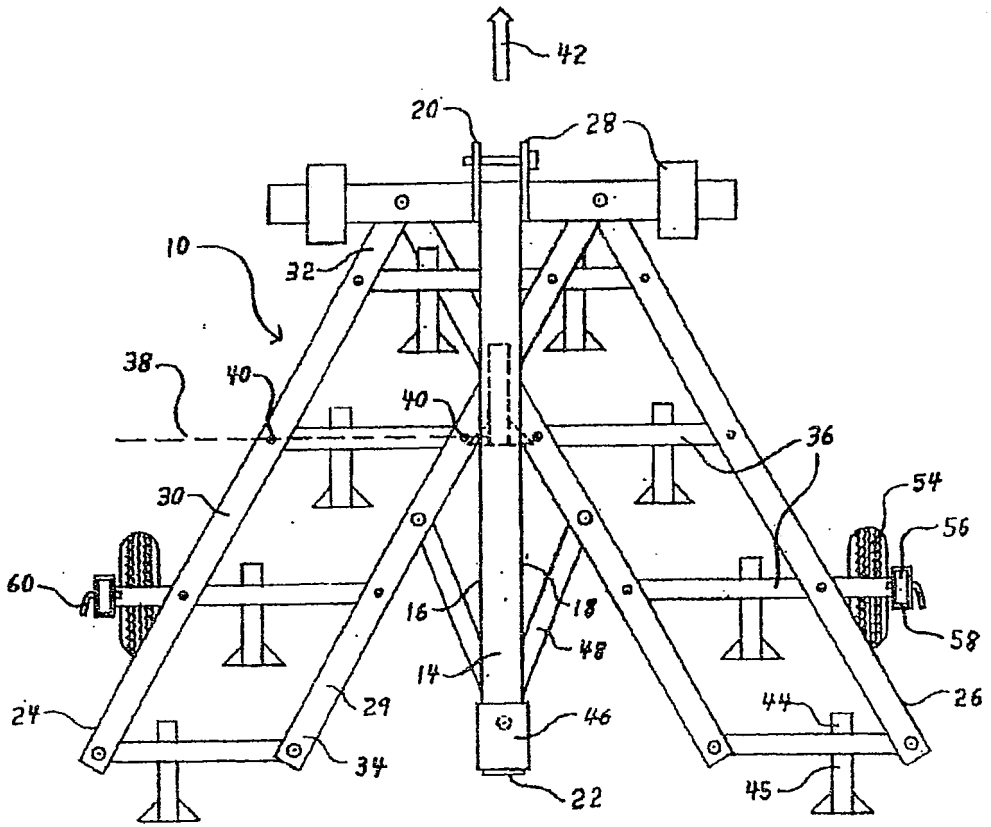

FIG.2

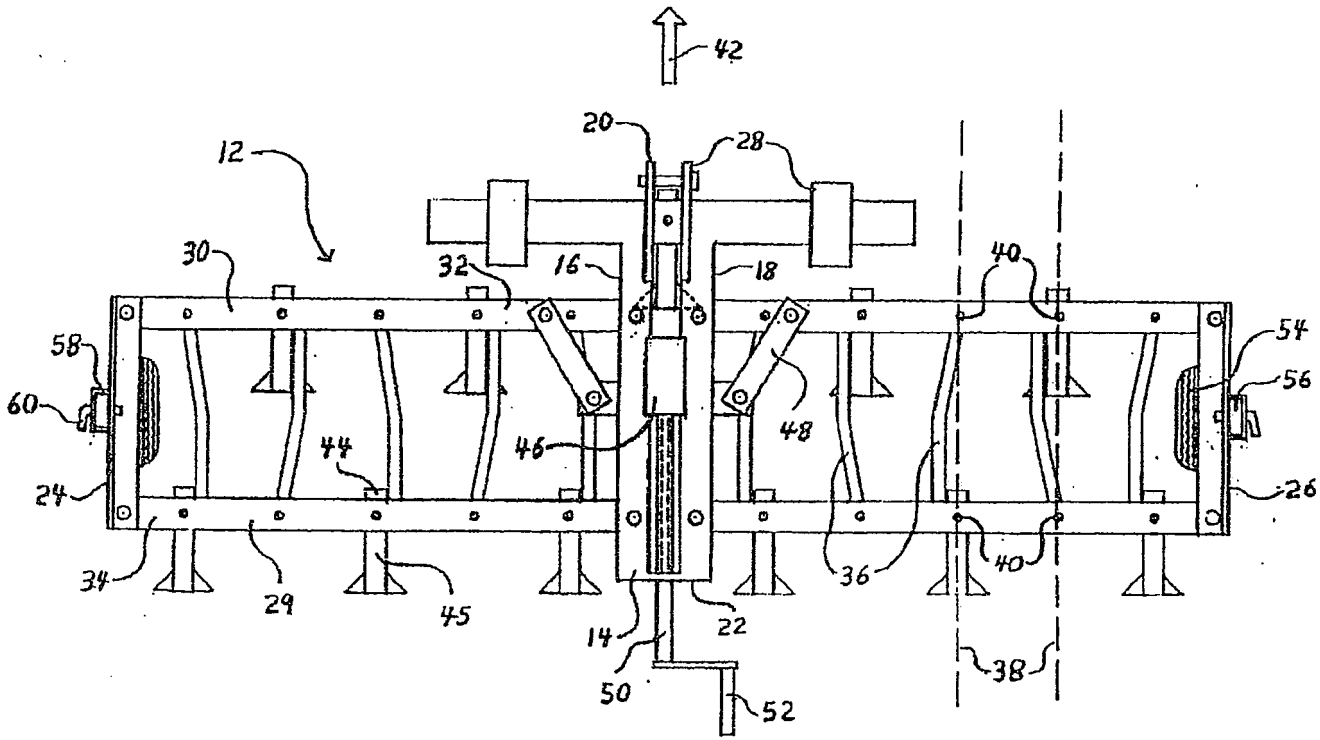

FIG.3

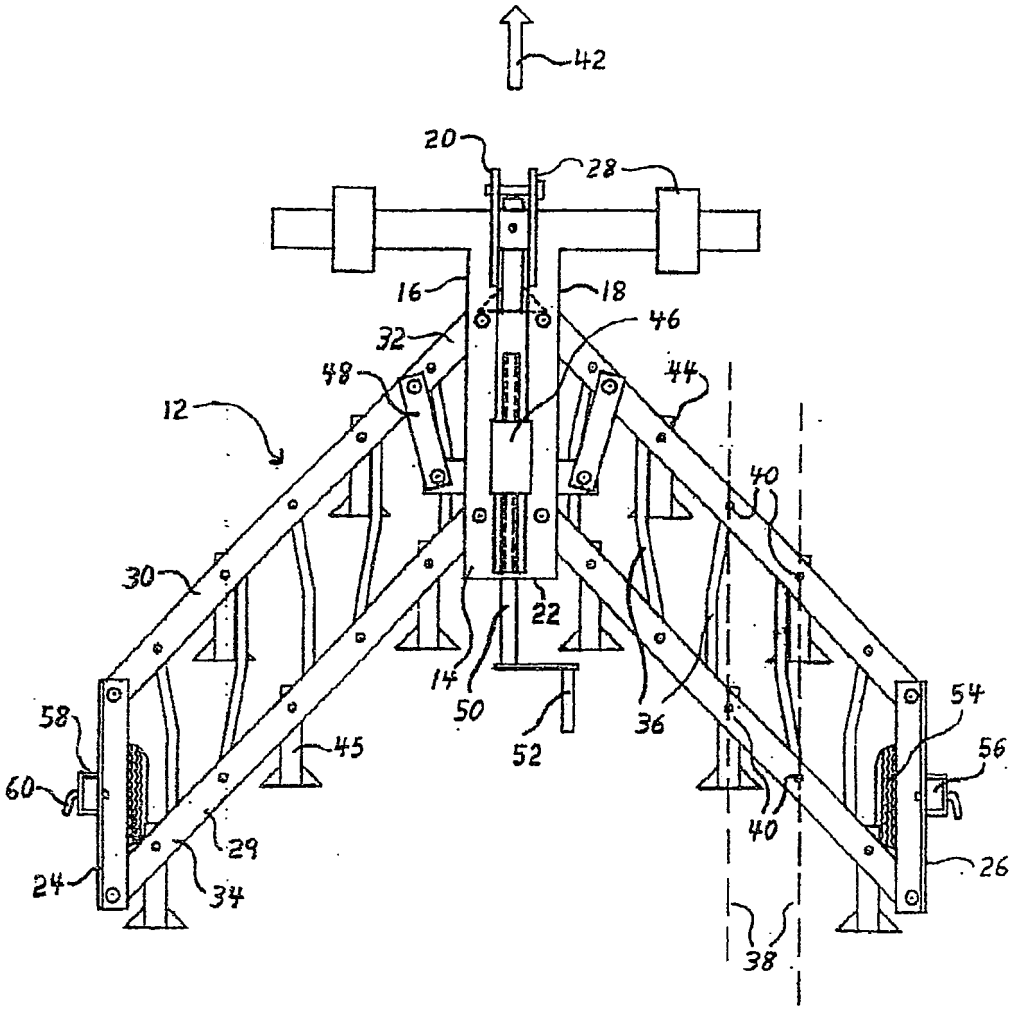

FIG.4

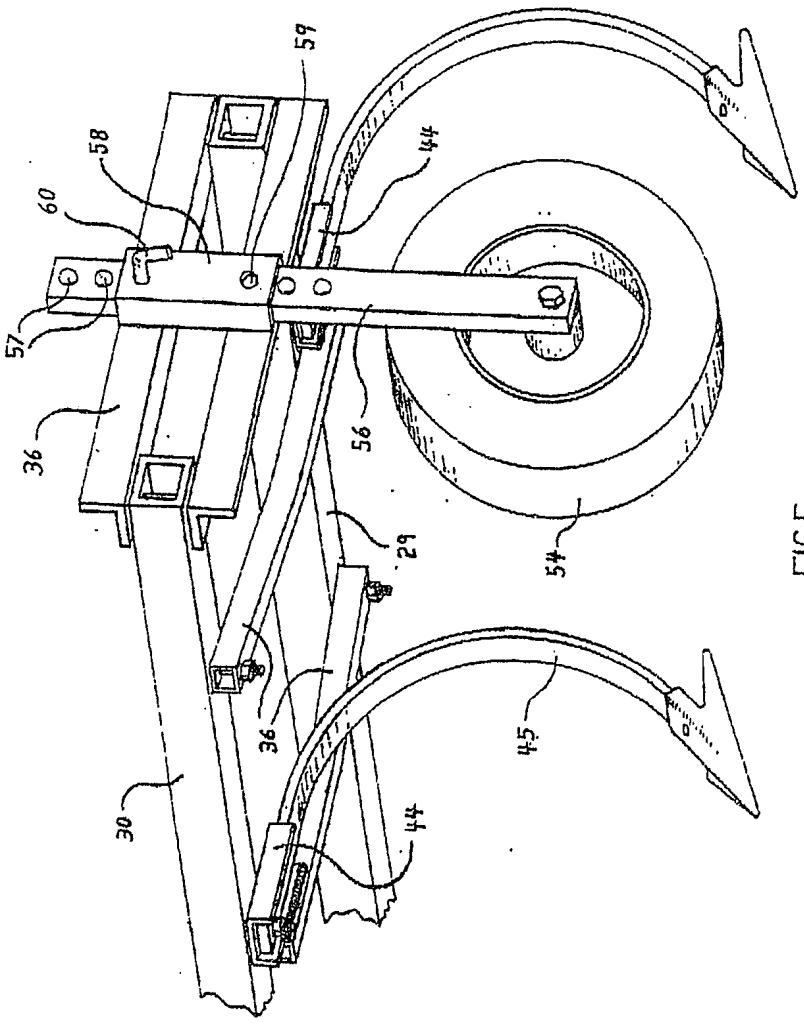

FIG.5